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ABSTRACT

A study involving two groups of students enrolled in two concurrent 16-week terms of a course taught at two Southwest Texas Junior College campuses compared the effects of traditional and non-traditional testing. The traditional approach consisted of typical individual testing, while the non-traditional approach involved group testing (i.e., two students collaborating on one test instrument). The anxiety level of each group was assessed within the design of the investigation. Subjects included 26 students in the traditional group and 20 students in the non-traditional group; the course in both cases covered principles of management. Results indicate that: (1) anxiety levels were lower among students taking group tests, and (2) reduced anxiety levels influenced the students' test performance. Three data tables and two bar graphs are included. The 37-item anxiety level pretest with grading key, the 37-item anxiety level posttest with grading key, an article on tandem testing, and an article on the Partnership Exam are appended. (TJH)

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A COMPARISON OF TRADITIONAL AND NON-TRADITIONAL METHODS OF TESTING

Applied Educational Research and Evaluation

by

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A Practicum presented to Nova University in partial fulfillment of the requirements for the degree of Doctor of Education

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ABSTRACT

The purpose of this study was to examine the differences in test scores between students that received traditional tests (each student taking an individual test), and students receiving non-traditional group measurements (two students collaborating on one test instrument). Also, the anxiety level of these two groups was tested to determine if traditional test taking produced higher levels of anxiety than the non-traditional group measurements, and to determine if higher test scores resulted from reduced anxiety levels. It was hypothesized that students would score higher on group measurement than those taking individual tests; that test anxiety would be reduced for group measurement participants, as opposed to independent test takers.

Procedures for conducting this study were designed to cover two concurrent sixteen-week terms of a course taught on two campuses of Southwest Texas Junior College (SWTJC). The two groups of students used were those who voluntarily enrolled for the Principles of Management (MGT 230) course. The control group taking individual tests consisted of twenty-six students; the experimental group taking group measurements consisted of twenty students.

Conclusions drawn from this study showed there was enough difference in anxiety level scores to indicate that reduced levels of anxiety favored those subjects in the experimental group taking the group measurements. Therefore, reduced anxiety levels influenced the test performance.

Based upon the findings of this study it is recommended that further investigation be directed toward the examination of the processes, methods, and procedures used in measuring the knowledge level of students in the classrooms of postsecondary education.

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Chapter 1

INTRODUCTION

The traditional method of testing appears to limit educational progress in the classrooms of higher education; therefore, a non-traditional approach to testing was investigated in this study. The term non-traditional testing is that type of testing that takes on a more modern approach toward testing methods, such as group measurement. And, group measurement is defined as creating a testing situation where two students jointly collaborate in solving the questions on a single test instrument. This research may serve to influence educators at Southwest Texas Junior College (SWTJC), and elsewhere, to examine their current views toward the processes and procedures of administering examinations to students. Those students engaged in postsecondary education have traditionally been expected to respond to examinations on an individual basis. This method of examination could create anxiety levels that detract from the ability of a student to perform and achieve the best potential score on an examination. Consequently, if those traditional testing methods produce anxiety, then an alternative method could serve to reduce anxiety and permit the student to score higher on examinations.

In an effort to provide some information toward the traditional methods of testing, Paul Woodring (1968:174) states that

> If a perceptive observer from another land were to take a close look at all the colleges and universities in the United States he might reasonably conclude that the higher learning in America rests upon the following set of assumptions, which include: That grades should be based in substantial part on written exercises called "examinations." And that a student taking an examination must never be allowed to consult his notes, use reference materials, or communicate with anyone--he must rely on sheer memory.

Additionally, Sara Gilbert (1983:6) when addressing the concept of becoming testwise states

> The testwise members of your class are not necessarily the brightest ones. They may not even be the hardest workers. But they know how to study and prepare. They also have a positive attitude, and a relaxed approach that comes from knowing how to take tests. They don't have to waste time or energy sweating over the specific techniques demanded by each type of test question.

There appears to be a traditional mental mind set of status quo, or resistance to change, in regard to general testing procedures. That seems a plausible reason why these suggested departures from the familiar and toward change are so difficult to achieve and implement. And in an attempt to provide some information to this seemingly resistant attitude toward testing processes and methods the following is offered.

Sir Eric Ashby, Vice-Chancellor of the University of Cambridge, speaking in 1963 on "Investment in Man" in his presidential address to the British Association for the

Advancement of Science, (Eurich, 1969:138), stated the issue poignantly

> Why is there such resistance to change, to innovate, to improve our teaching procedures? The reason, I think, can be simply stated: 1. Tradition: the customs of Academia are notoriously conservative; 2. Motivation: the faculty have no interest in being more efficient; 3. Laziness: teachers follow the methods of those who have taught them; 4. Comfort: following the same procedures year after year is much easier than changing; 5. Economy: the old methods seem to save time and effort which can then be used in other activities such as research and writing which are valued more highly than teaching by universities in promotions and salary; 6. Technology: the outmoded construction of buildings and other facilities freeze instructional procedures; 7. Timidity: why stick out your neck and be criticized, when your present procedures are adequate by current standards?

Thus, when these comments from the above referenced literature are analyzed it would seem that educators would not consider teaching refined test-taking routines but opt for changes to bring good, solid knowledge to the student and build a foundation that will withstand the weight of further knowledge. And in support of deciding the direction to take, this research endeavor was designed to provide information on the subject of testing and the type of testing that appears to be a better or alternative method to measure knowledge and reduce the level of anxiety that may inhibit a more correct method of measuring or evaluating that knowledge.

It should be noted that a radical or impulsive departure from time-honored testing techniques was not the express objective of this study, but rather to examine

other procedures that could enhance current methodologies of testing. A progressive, forward looking, attitude toward traditional methods could create innovations that will serve higher education well as institutions encounter increased demands for updating of current regulatory activities.

In this study the issue of student anxiety toward testing was investigated by administering both a pre-test and a post-test to determine the anxiety level of the students before the initial examination and final examination was administered. This anxiety factor is addressed by John J. Chiodo (1987:46) when he states

> I entered the ranks of academe unaware of the threat midterm exams posed to the health of students and their relatives. It didn't take long, however, for me to realize that a real problem existed. The onset of midterms seemed to provoke not only a marked increase in the family problems, illnesses, and accidents experienced by my students, but also above-normal death rates among their grandmothers. I began to realize the situation was serious. In the two years I had been teaching, 12 grandmothers had passed away; on that basis, if I taught for 30 years 180 grandmothers would no longer be with us.

Although Professor Chiodo used a seemingly humorous characterization he makes his point by describing a plan for reducing student anxiety toward testing as shown in the following highlights of his system:

-Review the scope of the examination several weeks ahead of time and let students know what will or will not be covered.

-Use practice tests and sample questions and answers to familiarize them with the professor's language.

-Be clear about time limits allowed for students to answer the test questions.

-Announce what materials will be needed and what aids will be permitted in the classroom during examinations.

-Review the grading procedures. Even though the syllabus contains this information, it is helpful to repeat it.

-Review the policies on makeup tests and retakes. Tell students the legitimate reasons for missing an examination and if the makeup will be the same or different from the one missed.

-Provide study help. Some students may need one or more formal, but optional, study sessions or extra work in a study guide, etc.

-Make provisions for last minute questions. Set a time, as close to the exam as possible, when you will be available for questions; set procedures for questions during the actual test.

-Allow for breaks during long exams. If over 50 minutes, let them stand and stretch and go to the restroom--one at a time.

-Coach students on test-taking techniques. Remind them to scan the whole exam so they can plan their allotted time effectively; insure directions to them are clear before they start.

And Professor Chiodo (1987:48) concludes

> I have been following these rules for 13 years now, and during that time have heard of only an occasional midterm-related death of a grandmother. Such results lead me to believe that if all faculty members did likewise, the health and welfare of students--and their grandmothers--would surely benefit.

These rules by Chiodo are furnished to amplify the idea that innovative tactics do reduce the anxiety level of students. It would appear then that other avenues should

be explored to further enhance this situation and bring forth more improvement in the quest for educational excellence and progress.

Statement of the Problem

The non-traditional approach to traditional testing is merely an assessment to determine if the traditional testing method should be replaced, or augmented, with a more non-traditional method. The older traditional method requires, usually, each student to take an examination individually. This method, the non-traditional, has been researched and during that research students were permitted the opportunity to take group measurements. The key question considered in this research was: Will students that take the group measurement score higher than students that test individually? A related question considered was: Will students experience reduced test anxiety by taking a group measurement as opposed to taking an individual test?

The research results strongly indicate that the non-traditional method of testing is better than the traditional method. This theme will be further explained in the following account on this topic of non-traditional versus traditional techniques for testing students in higher education.

Statement of Purpose

The express purpose of this research was to investigate ways of improving methods of testing in the classrooms of postsecondary education. Therefore, an approach to a non-traditional method of testing was examined by allowing pairs of students to solve the problems on one test instrument per pair of students (experimental group), and the results of those group measurement scores were compared to the traditional approach to testing where each student (control group) had to take the test individually.

Moreover, as this study progressed it was discovered, with interest, that other researchers had performed inquiry into testing methods. For example, the Tandem Testing method was initiated by Carolyn Roth at Northern Virginia Community College, Woodbridge, Virginia. Roth (1986:1) states

> I began using tandem testing with one class in the summer of 1980, but it has been so well-received by students and so effective that I now use it in all my classes..each test provides evidence that my aim of fostering cooperative skills is yielding results. Communication skills are honed through struggles to express one's ideas to a partner. Efforts to influence one another range from "I don't know why, I just think my answer is right" to detailed explanations and examples. Development of trust follows the experience of going along with the partner, in doubt or in confidence, and getting the item right. Conflict management styles emerge through practice, as both partners must agree on a single answer. [This article, in its entirety, is attached in Appendix C].

To further expand on the purpose of this study it was also interesting to realize that research has been done on the Partnership Exam. This process involves pairs of students working on a single test instrument, and to further clarify this process (Lester, 1987:1) states

> To a veteran teacher who has heard years of disparaging remarks about mathematics, it is, indeed, heartwarming to see students begin to test with genuine hope, to work at that task diligently and cooperatively and, yes, to show evidence of some enjoyment. In my opinion, the thought of cooperative learning holds many implications for individual growth and a sense of community that seems to be disappearing in today's world.
>
> In the words of an ancient sage, "Come, let us reason together." [This article, in its entirety, is attached in Appendix D].

The foregoing account of opinions and studies on the subject of non-traditional testing seem to give credence to the purpose of further research into this topic. Furthermore, it seemed expedient to delve into a deeper dimension of non-traditional testing and compare that method with the traditional technique. That deeper dimension was the purpose of this research endeavor.

Chapter 2

BACKGROUND AND SIGNIFICANCE

Throughout many years of educational history the idea of measurement and evaluation of acquired knowledge levels has been an actively debated issue. There have been changes in concepts of educational evaluation over the years, and some general concepts are offered by Jack C. Merwin (Tyler, 1969:6)

> As one surveys the literature, it becomes obvious that . . . changes have evolved primarily through interactions of evaluation practices with three other aspects of education. In one such interaction, evaluation practices have affected and been affected by the acceptance of various learning theories and approaches to education. A second interaction has been that of evaluation practices with roles accepted for evaluation. The third interaction has been between evaluation practices and technical developments in measurement and evaluation itself. Within this framework of interactions and development, concepts of evaluation have changed on and relating to such issues as (a) who (or what) should be evaluated, (b) who should evaluate, (c) how evaluations should be conducted, and, (d) how evaluations can best be integrated into the educational process.

Thus, it becomes evident that the controversy concerning measurement and evaluation has been an issue for a long period of time. For instance, an English schoolmaster, the Reverend George Fisher produced a "Scale-Book" in 1864 that he used for measurement in education. As Jack C. Merwin (Tyler, 1969:7) further commented

> And, the emperor of China is said to have used a rudimentary form of proficiency testing about 2200 B.C. to examine his officials every third year. The exact content or methods of testing at that time are not a matter of record, but for 1115 B.C. (during the Chan dynasty), approximately a thousand years later, the nature of the testing employed is clear. At that time, job sample tests requiring proficiency in music, archery, horsemanship, writing, and arithmetic were used.

The importance of testing has been placed into perspective by Leonard P. Ayres (1918:196) when he said, "The importance of the (educational measurement) movement lies not only in its past and present achievements, but in the hope of the future." This idea stated by Ayres is a contributing factor toward this research effort, to further investigate testing and examine present ideas with the future in mind, and seek even better methods of testing. This is further reinforced by Douglas E. Scates (Tyler, 1969:12) when he wrote

> The improvement of classroom testing seems to lie in the following three directions: (a) a more carefully considered set of purposes for which testing is done; (b) a greatly broadened and enriched set of outcomes which must be measured; and (c) the development of instruments appropriate to the newly created needs.

Testing development has evolved during a period of over 4000 years. And that evolutionary process has occurred based on the progressive actions of many researchers that sought better, more effective methods to measure the knowledge levels of people, especially in an educational setting.

Moreover, testing has far reaching implications in different areas. For instance, the Intelligence Quotient (I.Q.) score is regarded as important because it is widely believed that it is highly stable; that it determines the individual's capacity to learn and that little can be done to alter it. Also, as stated by Benjamin S. Bloom (Tyler, 1969:43)

> The examinations which are used for certification of the completion of an educational program, for the selection of students for particular programs or streams of education, and for the determination of which students are to be admitted to advanced programs of education are so critical in the lives and careers of students that they not only have effects on the student and the educational system but they also influence the entire society.

It seems then that further probing into this subject of testing is, or should be, a factor to continually pursue. If scores on tests are so critical to the future of students as explained by Bloom, then if those scores can be raised without degradation to the educational system then likely the future of the student is enhanced. Also, the image of the institution of higher education is elevated to greater heights, and society is served as a result.

It appears that too much emphasis is placed upon test scoring instead of assessing what a person is capable of practically applying from their knowledge base. Of course, some guage is needed to act as a separator of knowledge levels, and with that in mind it was not the purpose of

this study to eliminate testing but to refine the process to some degree. And, if test anxiety can be reduced in the student then better scores may result and even the absorption and retention of information taught may be improved.

Furthermore, to strengthen the idea of the effects of evaluation, the following is offered by Bloom (Tyler, 1969:45)

> Evaluation is a two-edged sword which can enhance student learning and personality development or be destructive of student learning and personality development. It can have positive or negative effects on teachers, curriculums, and school systems. While it is unlikely that examinations and other methods of appraising the learning progress of students can be eliminated, it is possible to use evaluation procedures wisely, so that they may have a beneficial effect on learning and teaching. This is a matter of designing and using evaluation with a clear awareness of its possible effects and with a sensitivity to the ways in which the evaluation will be perceived by students, teachers, school authorities, and school patrons or the public.

There is considerable evidence that some pupils are severely penalized by their inability to perform under the stress of an examination. Others perform better under competitive conditions. This study has shown that group measurement does allay, to some degree, this stress or anxiety and at the same time provide the competitive edge that increases the performance of those students that tested with a partner.

In consideration of the foregoing it would seem appropriate, even expedient, to continue research into the area of testing methodologies.

This practicum was a direct result of the Applied Educational Research and Evaluation Seminar where the development of a research design was a major requirement.

Chapter 3

PROCEDURES AND METHODOLOGY

Procedures for Collecting Data

This study covered two concurrent sixteen-week terms of the course, Principles of Management (MGT 230), taught on two campuses of SWTJC, September - December 1988. Sample size was forty-six students and consisted of students who voluntarily enrolled for the course. Those students that enrolled were assumed to constitute a sample of the general enrollment at SWTJC. The inability to random sample, then, was considered a limitation of the study.

The tests used to measure the scores for both the control group and the experimental group of students were identical except for title. The title of the instrument used to measure the control group was titled "Test" and the instrument used to measure the experimental group was titled "Measurement". These instruments were composed of multiple choice, true/false, completion (fill in the blank), and brief essay type questions. The experimental group of twenty students was divided into ten teams of two students each, and each of these teams collaborated on one test instrument. This was classed as group measurement and characterized as a non-traditional approach to testing.

The control group, consisting of twenty-six students, was administered identical tests as given to the experimental group, but were tested individually. This was classed as the traditional approach to testing.

Students in the experimental group were permitted to select their group measurement partner; thus, arbitrary matching of teams was prevented. Also, when a group measurement partner was selected no changes were permitted for the duration of the research period. Furthermore, information collected on students in both the experimental group and control group was discarded if a student withdrew from class during the research period. For example, when a group measurement team of two students was dissolved due to withdrawal of one of the team members, all information collected at that juncture was discarded and not used in the study. Scoring of these three tests and three group measurements was based upon a zero to one-hundred point scale, for each test/measurement.

Three examinations were administered to both the experimental group and the control group. Individual examinations were given to the control group, and group measurements were given to the experimental group. These tests/measurements were scheduled and administered in three quasi-equal intervals covering lecture and textbook content for the September - December 1988 term. Classes met once each week for three hours in duration from six o'clock to nine o'clock in the evening.

In addition to the above described tests, anxiety tests were also administered during the September - December 1988 period to measure the levels of student anxiety. Anxiety level of students was measured by using the Anxiety Level Pre-Test (Appendix A), and the Anxiety Level Post-Test (Appendix B). The pre-test was given to students of both the control group and experimental group immediately before the first test/measurement was given, and the same procedure was repeated for the post-test that was given immediately before the last test/measurement was given. Scoring for each of these two anxiety level tests was based upon a zero to one-hundred point scale; each of the thirty-seven questions had a score value of 2.7027 points.

At the conclusion of the sixteen-week term for each of the two courses, Principles of Management; all test, measurement, and anxiety level data was tallied and displayed in tables and figures. (Complete explanation of these data is contained in Chapter 4, Results of the Study).

Research Hypotheses and Procedures for Treating Data

The hypotheses used in the research of this study were:

1. The Null Hypothesis

   (a) There will be no difference between the three

sets of test scores: Test 1, 2, and 3, individual tests for the control group, and Group Measurements 1, 2, and 3, group measurements for the experimental group. Independent t-test used.

(b) There will be no difference in pre-test and post-test anxiety levels between individual test-takers and group measurement test-takers. Analysis of covariance with Pre-Test as concomitant variable used.

(c) There will be no difference between course average scores for the control group and the experimental group. Independent t-test used.

2. The Alternative Hypotheses

(a) There will be a significant difference between individual test scores (control group), and group measurement scores (experimental group), such that course average scores will be higher for subjects taking the group measurements.

(b) Test anxiety level will be lower in the experimental group than in the control group.

All hypotheses were tested at the .05 level of significance. And since N = 30 or less subjects, in the researched student groups, the t-distribution was used. The results of these hypotheses are contained in Chapter 4, Results of the Study.

Limitations and Assumptions of the Study

The students used in this study were those that voluntarily enrolled in the two MGT 230 courses, and were assumed to constitute a sample of the general enrollment at SWTJC. Therefore, this created a limitation since random sampling was not possible.

Also, the number of entering freshman students in the control group consisted of six of the twenty-six subjects used, compared to fourteen entering freshmen of the twenty used in the experimental group. Thus, one percent in the control group compared to four percent in the experimental group was considered a limitation of indeterminate significance on the outcome of the study.

And, finally, variance of test scores may have affected reliability of the study, from such sources as attitude, reading and comprehension skills, emotional reactions or level of self-confidence in test taking situations. Other factors such as fatigue, attitude toward the test, emotional strain, personal health, and general environmental conditions concerning real or imagined effects of light, heat, and ventilation could have been limiting factors and thereby could have produced results of one group over the other that biased the results of the study.

The overall assumption, therefore, is that this research endeavor alone is not sufficient to conclusively show that the non-traditional method of testing is indeed superior to the traditional method. This assumption is formulated from the lack of significant difference (at the .05 level) between the control group and experimental group studied. However, assuming this study will be replicated by other research efforts, in the future, a more conclusive case could be made to support or to reject the non-traditional approach to testing.

Definition of Terms

The following listing of terms is included to more fully clarify the intended meaning of the terms used in this research.

Control group is defined as those students/subjects designated to receive the individual test treatment.

Current regulatory activities is defined as those functions within postsecondary education that are currently required, but may or may not be effectively serving the needs of the institution.

Experimental group is defined as those students/subjects designated to receive the group measurement treatment.

Group measurement is defined as creating a testing situation where two students jointly collaborate in

solving the questions on a single test instrument. This is classed as a non-traditional approach to testing.

Independent or Individual test is defined as a testing situation where one student solves the questions on a test instrument. This is classed as the traditional approach to testing.

Measurement, test, examination, and evaluation are defined as terms that are used to describe the measurement of knowledge of a student by using a written instrument or oral method concerning a particular academic subject or situation.

Post-test is defined as a test instrument administered after a pre-test to determine, comparatively, whether or not test scores varied.

Pre-test is defined as a test instrument administered to determine, comparatively, whether or not test scores varied between the pre-test and post-test.

Principles of Management course is the course title of the management (MGT 230) course that was taught to the students during this research endeavor.

Score(s) is/are defined as the numerical value (zero to one-hundred) used to denote degree of achievement on a test instrument.

Stress is defined as a psychological state of feeling mentally distressed when subjected to a test taking situation.

Student or subject is defined as anyone enrolled in the MGT 230 course, as a participant in this research project.

Test anxiety is defined as a psychological state of uncertainty, apprehension, or worry when subjected to a test taking situation.

Test instrument is defined as written examinations taken from the MGT 230 course and administered to subjects in this study.

Chapter 4

RESULTS OF THE STUDY

Interpretation of Results

After all three tests and group measurements had been administered to the control group and experimental group, all scores were recorded and displayed in both table and figure format.

Table 1, page 23, contains the Principles of Management individual test scores for the control group. Scores for each of the twenty-six students, for each of the three tests are shown and the course average for the three tests was computed and displayed horizontally in the fourth column. The vertical column totals were computed and an average for each of the three tests was shown. For example, Test 1, column one, reflects a total class score of 2079 divided by twenty-six, thus a class average of eighty percent for Test 1 was derived. The same computational process was used for the other two tests. Column four shows a course average of all three tests, and reflects a vertical, total course, score of 2072 divided by twenty-six for a course average grade of eighty percent. Scores are arranged in ascending order.

Table 1

Principles of Management Course
Individual Test Scores
(Control Group)

N = 26

	Test			Average
	1	2	3	(1-3)
	56	60	53	56
	42	69	70	60
	56	71	80	69
	70	57	79	69
	74	67	73	71
	65	60	89	71
	67	72	73	71
	71	68	77	72
	75	66	79	73
	74	68	81	74
	70	72	84	75
	80	70	79	76
	80	71	80	77
	78	59	97	78
	80	80	79	80
	75	82	90	82
	92	75	88	85
	91	84	92	89
	100	79	91	90
	97	83	89	90
	98	84	93	92
	90	92	93	92
	100	84	96	93
	100	86	99	95
	100	89	95	95
	98	92	100	97
Totals	2079	1940	2199	2072
Averages	80%	75%	85%	80%

Table 2, page 25, contains the Principles of Management group measurement scores for the experimental group. The same computational treatment was used for this table that was used for Table 1. The only variations are: (1) the number of subjects in Table 1 were twenty-six; in Table 2, twenty; (2) course average scores in Table 1 are arranged in ascending order for each individual student. In Table 2, course average scores are arranged in ascending order, in sets, to reflect the team scores, thus ten sets of scores are displayed.

The course average for the control group, Table 1, page 23, was eighty percent, while the course average for the experimental group, Table 2, page 25, was eighty-two percent. Figure 1, page 26, was developed to summarize Tables 1 and 2 in graphic format, and compare the three individual test scores with the three group measurement test scores, to include a course average comparison between the two groups in the research study.

In view of the foregoing account, the comparison between the control group and the experimental group produced results that show there was no significant difference between the control group test scores and the experimental group test scores. Therefore, the data support the null hypothesis [Refer to Item 1 (a) and (c), Chapter 3, pages 16 and 17]. Further, the statistical calculations reject the alternative hypothesis [Refer to Item 2 (a), Chapter 3, page 17].

Table 2

Principles of Management Course
Group Measurement Scores
(Experimental Group)

N = 20

	Group Measurement			Average
	1	2	3	(1-3)
	54	49	76	60
	54	49	76	60
	63	71	83	72
	63	71	83	72
	75	72	81	76
	75	72	81	76
	82	72	81	78
	82	72	81	78
	85	78	85	83
	85	78	85	83
	89	75	87	84
	89	75	87	84
	92	85	90	89
	92	85	90	89
	95	84	91	90
	95	84	91	90
	100	94	91	95
	100	94	91	95
	93	96	97	95
	93	96	97	95
Totals	1656	1552	1724	1644
Averages	83%	78%	86%	82%

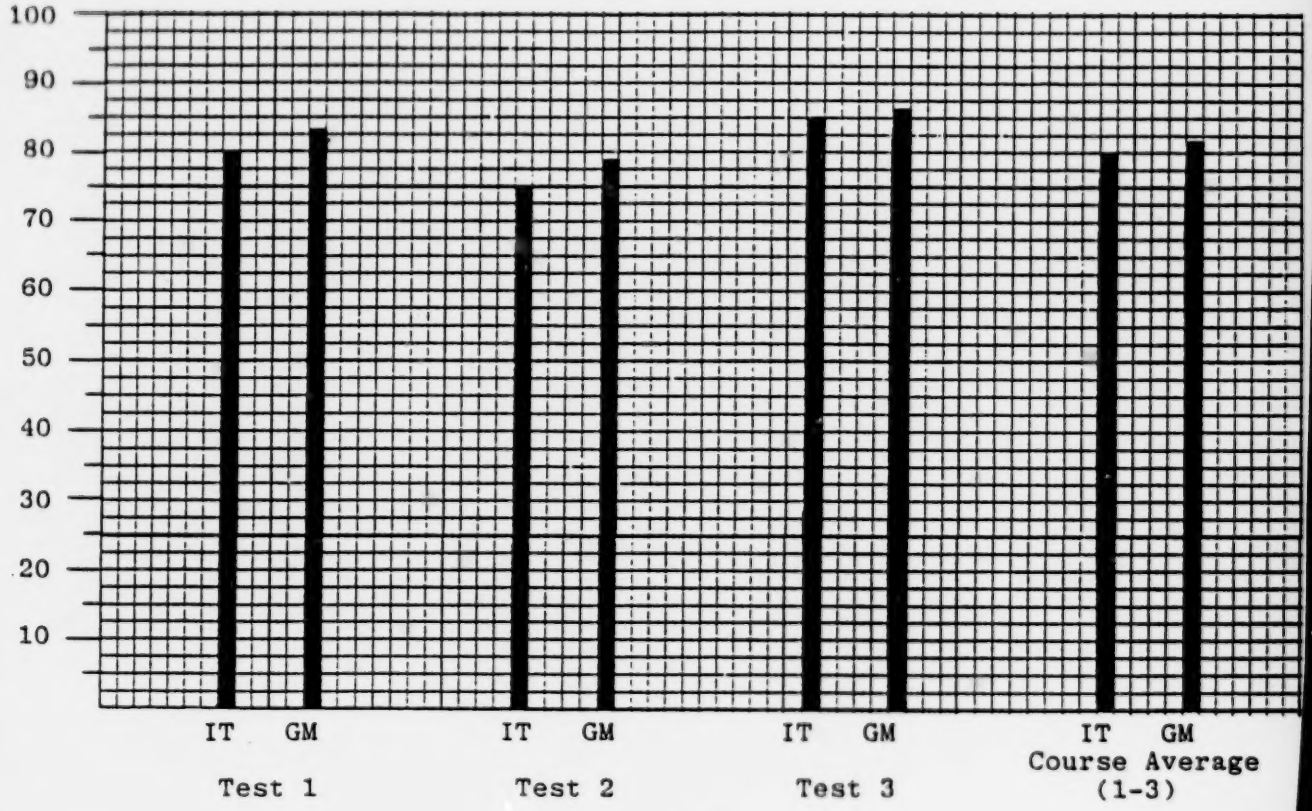

Figure 1

Individual Test/Group Measurement Scores
Principles of Management Course
(Summary of Tables 1 and 2)

Legend: IT = Individual Test Scores/Control Group
GM = Group Measurement Scores/Experimental Group

There was also a study conducted in this research to determine if anxiety level in the subjects would create a difference in scoring between the control group and the experimental group. An Anxiety Level Pre-Test (Appendix A), and an Anxiety Level Post-Test (Appendix B) was given to both the control and experimental groups. The pre-test was administered immediately prior to the first course test/ group measurement, and the post-test was administered immediately prior to the last, or third, course test/ group measurement. The results of those anxiety level tests are displayed in Table 3, page 28.

The statistical calculations, shown in Table 3, indicate there was no significant difference between the anxiety pre-test and post-test results for the control group. However, there was a significant difference between anxiety level pre-test and post-test results for the experimental group. Furthermore, there was enough significant difference between anxiety level pre-test/ post-test results between the control group and the experimental group to show that anxiety influenced the test performance. Therefore, it was concluded that the null hypothesis was rejected [refer to Chapter 3, page 17, Item 1 (b)] that states: "There will be no difference in pre-test and post-test anxiety levels between individual test-takers and group measurement test-takers."

Table 3

Principles of Management Course
Anxiety Level Test Scores

N = 26 Control Group; 20 Experimental Group

	Control Group		Experimental Group	
	Pre-Test	Post-Test	Pre-Test	Post-Test
	87	87	24	19
	84	78	81	46
	16	16	60	38
	35	27	35	43
	62	57	87	81
	87	92	60	54
	19	16	30	51
	60	51	46	49
	81	84	24	27
	35	22	43	51
	73	70	57	22
	43	27	78	46
	76	76	41	38
	38	38	68	54
	35	19	30	16
	87	76	92	78
	60	62	30	24
	68	33	51	49
	38	51	16	11
	51	51	78	52
	46	30		
	46	65		
	87	92		
	38	62		
	33	19		
	49	54		
Totals	1434	1355	1031	849
Averages	55%	52%	52%	42%

Figure 2, "Anxiety Level Test Results", page 30, has summarized the information provided in Table 3, page 28. The pre-test and post-test anxiety levels are graphically displayed and compared within the control group, and within the experimental group. The results show a significant difference between the Pre-Test and Post-Test results for the experimental group. Furthermore, there is a significant difference between the Post-Test results for the control group, and the Post-Test results for the experimental group. Thus, there was lower anxiety, to a significant degree, in the experimental group.

As a consequence, then, the alternative hypothesis was accepted. Refer to Chapter 3, page 17, Item 2 (b), that states: "Test anxiety level will be lower in the experimental group than in the control group."

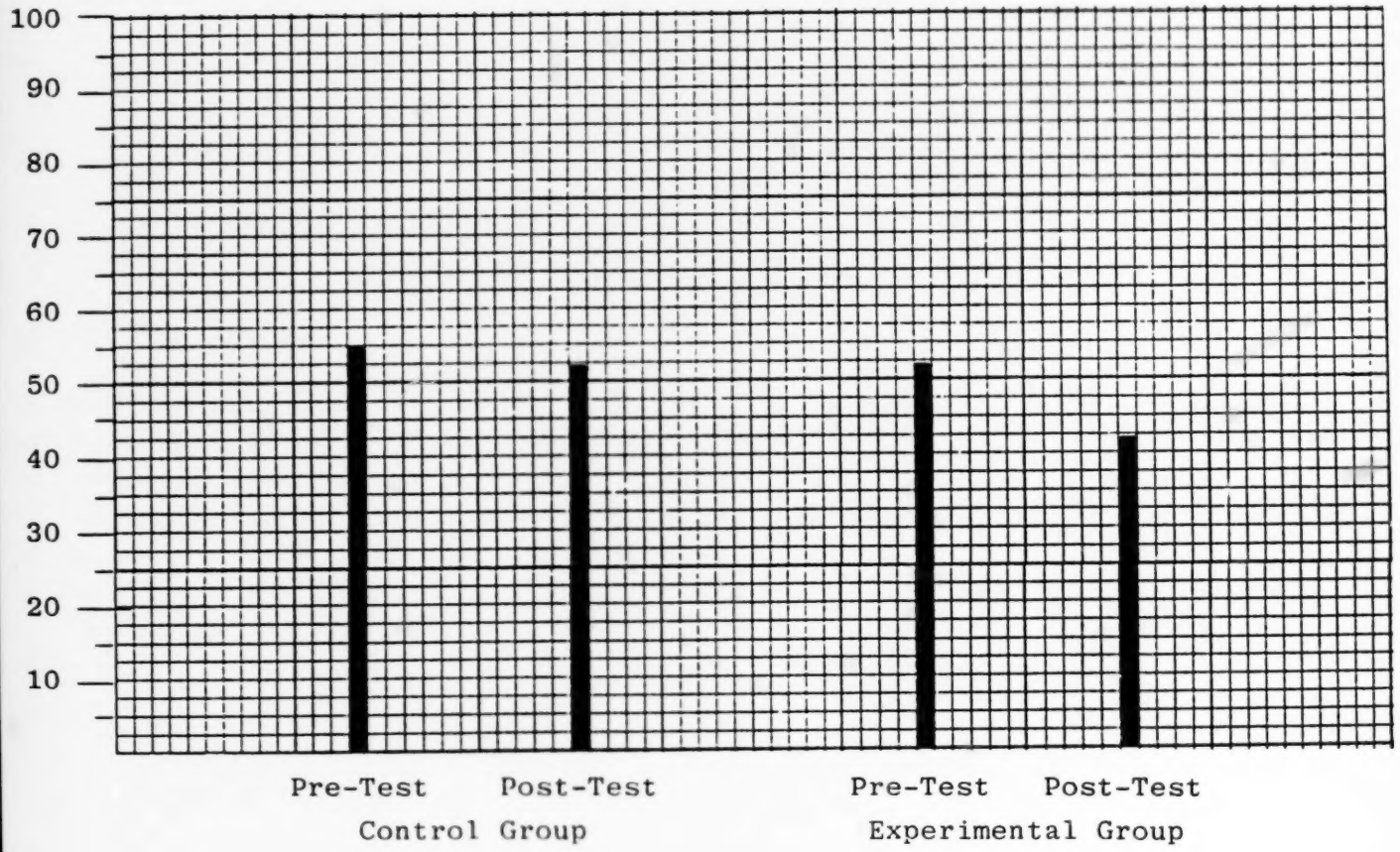

Figure 2

Principles of Management Course
Anxiety Level Test Results
(Summary of Table 3)

Chapter 5

DISCUSSION, IMPLICATIONS, AND RECOMMENDATIONS

Discussion of the Study

This study was designed to examine the feasibility of finding a more non-traditional approach to testing, specifically group measurement, than the traditional approach to testing, specifically individual testing, in the classrooms of postsecondary education. And, further, to examine during the course of this research, if anxiety in the traditional method of testing would be reduced in the non-traditional method of testing. Also, the research design that was constructed to study this issue was formulated to eliminate as much bias and ambiguity of meaning in the terms used, as possible.

Implications of the Study

Since a single study, using this specific research design, may not be sufficient to fully conclude that the results are indeed actually as stated was understood at the beginning of the research design, and before the study was launched. Yet, certain known variables that would threaten the process and conclusions of this study

were considered. For instance, attempts to control researcher bias was constantly monitored, in that researcher interference with subjects responses was controlled. The power of suggestion prior to, and during, test and measurement taking was held in a neutral position.

Furthermore, as the research of this study progressed, constant scanning of environmental conditions such as lighting, temperature levels, noise, and other various situations in the classroom during testing was held as constant and equal as possible for both the control group and the experimental group. The lecture material, including the number of chapters from the text, used in the Principles of Management course was presented to both groups on a consistently equal basis. Lecture was held for the control group on Wednesday evenings from six o'clock to nine o'clock, and on Thursday evenings during the same three hour time period, for the experimental group.

During the interpretation of results, from statistical computations, extreme precautions were used to interpret and present these results as accurately as possible, and while guarding against Type I (Alpha) Error and Type II (Beta) Error. That is, to insure the correct decision was made in regard to rejecting/accepting the hypotheses.

The implications of this study, then, seem to suggest that although the alternative hypotheses were not all realized, that further investigative efforts may produce a more supportive finding. Therefore, if this type research should be continued by others, over a period of time, a different result than shown herein may be realized.

Recommendations

This study, along with the referenced literature in the Bibliography and examples shown in Appendices C and D, has produced certain indicators that seem to sufficiently warrant that the use of non-traditional methods of testing receive further study and consideration. To measure the knowledge level of students and attempt to reduce anxiety in those students seems challenging enough, and important enough, to investigate the most refined and sophisticated approaches and methods to testing.

There is evidence contained in this study to show that reduced anxiety level in certain test-taking situations leads to a more relaxed psychological mental state of the test-taker, and results in improved test scores of those test-takers. But more importantly, if a student realized a more pleasant test-taking experience then the enhanced perception of self-esteem could induce greater levels of self-confidence. And, the student could,

as a result, not only exhibit reduced anxiety and score higher on tests, but in the process might feel better about the general process of education.

It is recommended, in view of the above information provided, that further studies be undertaken in accordance with this research design to determine on a broader spectrum if there is a need for institutions of higher education to consider changing testing methods. It appears that tradition may at times lead to complacency, and complacency may lead to a static system of education that does not keep pace with the rapid technological advancements. Therefore, higher systems of education and business and industry may have conflicting ideas about the educated product that is developed for the work world.

The final recommendation is to suggest full evaluation of testing methods and decide, after fully evaluating current testing methods, if the traditional methods should be retained or whether to further research and consider embracing different methods of evaluating the knowledge level of students engaged in study at institutions of higher education.

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APPENDIX A

SAMPLE OF ANXIETY LEVEL PRE-TEST

WITH GRADING KEY

Southwest Texas Junior College

Principles of Management
Course - MGT 230

September 1988

ANXIETY LEVEL PRE-TEST

NAME: _____

(Print: Last Name, First Name)

Instructions: Read each of the following statements and respond by marking either true or false.

1. (T) (F) While taking an important exam, I find myself thinking of how much brighter the other students are than I am.

2. (T) (F) If I were to take an intelligence test, I would worry a great deal before taking it.

3. (T) (F) If I knew I was going to take an intelligence test, I would feel confident and relaxed beforehand.

4. (T) (F) While taking an important examination, I perspire a great deal.

5. (T) (F) During course examinations I find myself thinking of things unrelated to the actual course material.

6. (T) (F) I get to feeling very panicky when I have to take a surprise exam.

7. (T) (F) During tests I find myself thinking of the consequences of failing.

8. (T) (F) After important tests I am frequently so tense that my stomach gets upset.

9. (T) (F) I freeze up on things like intelligence tests and final exams.

10. (T) (F) Getting a good grade on one test doesn't seem to increase my confidence on the next.

11. (T) (F) I sometimes feel my heart beating very fast during important tests.

12. (T) (F) After taking a test I always feel I could have done better than I actually did.

13. (T) (F) I usually get depressed after taking a test.

14. (T) (F) I have an uneasy, upset feeling before taking a final examination.

15. (T) (F) When taking a test my emotional feelings do not interfere with my performance.

16. (T) (F) During a course examination I frequently get so nervous that I forget facts I really know.

17. (T) (F) I seem to defeat myself while working on important tests.

18. (T) (F) The harder I work at taking a test or studying for one, the more confused I get.

19. (T) (F) As soon as an exam is over I try to stop worrying about it, but I just can't.

20. (T) (F) During exams I sometimes wonder if I'll ever get through college.

21. (T) (F) I would rather write a paper than take an examination for my grade in a course.

22. (T) (F) I wish examinations did not bother me so much.

23. (T) (F) I think I could do much better on tests if I could take them alone and not feel pressured by a time limit.

24. (T) (F) Thinking about the grade I may get in a course interferes with my studying and my performance on tests.

25. (T) (F) If examinations could be done away with I think I would actually learn more.

26. (T) (F) On exams I take the attitude, "If I don't know it now there's no point worrying about it."

27. (T) (F) I really don't see why some people get so upset about tests.

28. (T) (F) Thoughts of doing poorly interfere with my performance on tests.

29. (T) (F) I don't study any harder for final exams than for the rest of my course work.

30. (T) (F) Even when I'm well prepared for a test, I feel very anxious about it.

31. (T) (F) I don't enjoy eating before an important test.

32. (T) (F) Before an important examination I find my hands or arms trembling.

33. (T) (F) I seldom feel the need for "cramming" before an exam.

34. (T) (F) The University (or College) ought to recognize that some students are more nervous than others about tests and that this affects their performance.

35. (T) (F) It seems to me that examination periods ought not to be made the tense situations which they are.

36. (T) (F) I start feeling very uneasy just before getting a test back.

37. (T) (F) I dread courses where the professor has the habit of giving "pop" quizzes.

NOTE: This is the end of the Pre-Test. Go back and check your answers--be sure you have marked each statement with either a true or false response.

Source: Sarason, I. G. (1972). Experimental approaches to test anxiety: Attention and uses of information. In C. D. Spielberger (Ed.), Anxiety: Current trends in theory and research (Vol. 2). New York: Hemisphere/Wiley.

ANXIETY LEVEL PRE-TEST

GRADING KEY

Principles of Management
Course - MGT 230

September 1988

Correct Responses

1. True
2. True
3. False
4. True
5. True
6. True
7. True
8. True
9. True
10. True
11. True
12. True
13. True
14. True
15. False
16. True
17. True
18. True
19. True
20. True
21. True
22. True
23. True
24. True
25. True
26. False
27. False
28. True
29. False
30. True
31. True
32. True
33. False
34. True
35. True
36. True
37. True

APPENDIX B

SAMPLE OF ANXIETY LEVEL POST-TEST

WITH GRADING KEY

Southwest Texas Junior College

Principles of Management December 1988
Course - MGT 230

ANXIETY LEVEL POST-TEST

NAME: _____

(Print: Last Name, First Name)

Instructions: Read each of the following statements and respond by marking either true or false.

1. (T) (F) While taking an important exam, I find myself thinking of how much brighter the other students are than I am.

2. (T) (F) If I were to take an intelligence test, I would worry a great deal before taking it.

3. (T) (F) If I knew I was going to take an intelligence test, I would feel confident and relaxed beforehand.

4. (T) (F) While taking an important examination, I perspire a great deal.

5. (T) (F) During course examinations I find myself thinking of things unrelated to the actual course material.

6. (T) (F) I get to feeling very panicky when I have to take a surprise exam.

7. (T) (F) During tests I find myself thinking of the consequences of failing.

8. (T) (F) After important tests I am frequently so tense that my stomach gets upset.

9. (T) (F) I freeze up on things like intelligence tests and final exams.

10. (T) (F) Getting a good grade on one test doesn't seem to increase my confidence on the next.

11. (T) (F) I sometimes feel my heart beating very fast during important tests.

12. (T) (F) After taking a test I always feel I could have done better than I actually did.

13. (T) (F) I usually get depressed after taking a test.

14. (T) (F) I have an uneasy, upset feeling before taking a final examination.

15. (T) (F) When taking a test my emotional feelings do not interfere with my performance.

16. (T) (F) During a course examination I frequently get so nervous that I forget facts I really know.

17. (T) (F) I seem to defeat myself while working on important tests.

18. (T) (F) The harder I work at taking a test or studying for one, the more confused I get.

19. (T) (F) As soon as an exam is over I try to stop worrying about it, but I just can't.

20. (T) (F) During exams I sometimes wonder if I'll ever get through college.

21. (T) (F) I would rather write a paper than take an examination for my grade in a course.

22. (T) (F) I wish examinations did not bother me so much.

23. (T) (F) I think I could do much better on tests if I could take them alone and not feel pressured by a time limit.

24. (T) (F) Thinking about the grade I may get in a course interferes with my studying and my performance on tests.

25. (T) (F) If examinations could be done away with I think I would actually learn more.

26. (T) (F) On exams I take the attitude, "If I don't know it now there's no point worrying about it."

27. (T) (F) I really don't see why some people get so upset about tests.

28. (T) (F) Thoughts of doing poorly interfere with my performance on tests.

29. (T) (F) I don't study any harder for final exams than for the rest of my course work.

30. (T) (F) Even when I'm well prepared for a test, I feel very anxious about it.

31. (T) (F) I don't enjoy eating before an important test.

32. (T) (F) Before an important examination I find my hands or arms trembling.

33. (T) (F) I seldom feel the need for "cramming" before an exam.

34. (T) (F) The University (or College) ought to recognize that some students are more nervous than others about tests and that this affects their performance.

35. (T) (F) It seems to me that examination periods ought not to be made the tense situations which they are.

36. (T) (F) I start feeling very uneasy just before getting a test back.

37. (T) (F) I dread courses where the professor has the habit of giving "pop" quizzes.

NOTE: This is the end of the Post-Test. Go back and check your answers--be sure you have marked each statement with either a true or false response.

Source: Sarason, I. G. (1972). Experimental approaches to test anxiety: Attention and uses of information. In C. D. Spielberger (Ed.), Anxiety: Current trends in theory and research (Vol. 2). New York: Hemisphere/Wiley.

ANXIETY LEVEL POST-TEST

GRADING KEY

Principles of Management
Course - MGT 230

December 1988

Correct Responses

1. True
2. True
3. False
4. True
5. True
6. True
7. True
8. True
9. True
10. True
11. True
12. True
13. True
14. True
15. False
16. True
17. True
18. True
19. True
20. True
21. True
22. True
23. True
24. True
25. True
26. False
27. False
28. True
29. False
30. True
31. True
32. True
33. False
34. True
35. True
36. True
37. True

APPENDIX C

ARTICLE ON "TANDEM TESTING"

INNOVATION ABSTRACTS VOL. VIII NO. 29

Published by the National Institute for Staff and Organizational Development
With support from the W. K. Kellogg Foundation and Sid W. Richardson Foundation

TANDEM TESTING

The great American myth has it that success comes to those singular-minded, hard-driving individuals who force their way to the front of the pack. Students who survive a competitive educational system, who surpass all the barriers from admission to exams to graduation requirements, must be presumed to have the advantage over the less competitive (though perhaps no less able) peers over whom they leapfrog. But for some time social psychologists have maintained that cooperation is the key to success in any society. Recently the business world has beheld with admiration the success of the Japanese "Theory Z" methods, the essence of which is cooperation. James Coleman, in an article entitled "The Children Have Outgrown the Schools" (*Psychology Today*, February, 1972), has emphasized the importance of education's task of turning out responsible, productive persons who can effectively participate in cooperative situations.

Providing opportunities for cooperation in the classroom is not a new idea. Group projects are a common instructional approach, and there is a body of literature emphasizing the benefits. Peer instruction and study groups provide evidence of the gains to be made. But what about student cooperation in testing?

In most classes, that would be called cheating, but in my classes, we refer to it as collaborating. The procedure is simple: two students are given one copy of the test. They hand in one answer sheet with both their names on it, thus getting the same grade. Scoring is done immediately following the test to allow the pairs to examine any missed items. The pairs are formed by the students. Some pairs "bond" and test together through a three-quarter General Psych sequence. Other pairs are less stable. I encourage students, if they feel a partner is not pulling his/her weight, to find a new partner; but pair stability is the norm.

I began using tandem testing with one class in the summer of 1980, but it has been so well-received by students and so effective that I now use it in all my classes. Classroom atmosphere on test day is relaxed. A murmuring hum fills the air, punctuated by an occasional laugh. I can see the students' involvement with the material, in an attempt to persuade the partner of the correctness of an answer, one student may refer to something "she wrote on the board"; another student may cite a certain section of the text—they are actually *teaching each other* while taking the test! One student catches another's misinterpretation; one team arrives at a compromise: "We'll put my answer for number 6 and yours for number 24, okay?"

Each test provides evidence that my aim of fostering cooperative skills is yielding results. *Communication skills* are honed through struggles to express one's ideas to a partner. *Efforts to influence* one another range from "I don't know why, I just think my answer is right" to detailed explanations and examples. *Development of trust* follows the experience of going along with the partner, in doubt or in confidence, and getting the item right. *Conflict management* styles emerge through practice, as both partners must agree on a single answer.

Predictably, the students love it! In response to a brief questionnaire given to 103 students in my spring 1984 classes, 67 percent reported lower test anxiety with tandem testing while 15 percent said their anxiety level was higher. Seventy-eight percent reported the same amount of study time, 12 percent said they studied more, and 13 percent reported studying less. (In discussing the questionnaire, one student volunteered that she studied less because the support of her partner allowed her to abandon her compulsive over-studying.) Effect on grades: 53 percent believe their grades are higher with this system, 40 percent see no effect, and nine percent felt their grade was lower. I plan an analysis to check statistically the accuracy of the students' perceptions.

Community College Leadership Program, The University of Texas at Austin, EDB 348, Austin, Texas 78712

Asked what they saw as the greatest advantage of tandem testing, most students noted the reduced anxiety. The chief disadvantage cited was the problem of the unprepared student, either the prospect of being let down by your partner or the fear of not pulling your own weight. Some students noted that tandem testing takes more time, but my students manage 40-50 items in a 50-minute period without difficulty. One student complained, "It's hard to know what to do when you and your partner don't agree." Exactly what I want them to learn!

My teaching methods may not change the nature of American society or higher education, but I am convinced that my students are developing interpersonal sensitivity and collaborative skills that will serve them well.

Carolyn Roth
Northern Virginia Community College

For further information, contact the author at Northern Virginia Community College, Woodbridge Campus, 15200 Smoketown Road, Woodbridge, VA 22191.

From "Tandem Testing" by Carolyn Roth, 1984, *Network, The Newsletter for Psychology Teachers at Two-Year Colleges*, published by American Psychological Association.

Suanne D. Roueche, Editor
December 5, 1986, Vol. VIII, No. 29

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APPENDIX D

ARTICLE ON "THE PARTNERSHIP EXAM"

INNOVATION ABSTRACTS VOL. IX NO. 12

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With support from the W. K. Kellogg Foundation and Sid W. Richardson Foundation

THE PARTNERSHIP EXAM

Last spring semester as I was readying my thoughts for the mid-term exam in a remedial Algebra course I was teaching, I considered how I would score and evaluate over 50 papers AND prepare for an exam in a Data Structures class I was taking. As is my custom, I gave the students a list of sample problems as review to work during class so that I could field their questions. I suggested that they work in pairs for discussion and learning.

As I observed the great eagerness with which they took on this task, it occurred to me—what a great way to GIVE the test! With 50 students, cheating is extremely difficult to control. If they were in Noah-Numbers, there wouldn't be a reason or an opportunity to cheat. (And all students seem to know by instinct the voice volume level appropriate for such an endeavor.) When I remarked to them in closing the class that this would, indeed, be the format procedure for the exam, their eyes widened in disbelief—like, "Is she coming off the wall or what?" I assured them that I was quite serious about my plan, explained that it would be an experiment, and added that "solo flights" would be allowed. The pairs would turn in one organized worksheet for the same grade for each partner. This meant that partners had to come to an agreement about the accuracy of the solution.

Students developed their own methods of sorting themselves. Those who seldom attended or prepared for class were left to fend for themselves. The workers chose not to share their expertise with the drones. The most overwhelming aspect was the atmosphere of work in action which, in a school situation, may mean that learning is taking place.

As the semester progressed, each pair found whether or not that pairing would work out. If it was not a good match, partners switched or went it alone. Some planned study strategies together. All had their own style, such as both working the problems, then comparing or deciding who was best at what type. But however it was managed, the students were the decision makers, and few, if any, complained about grading or problem difficulty level (even though it was generally agreed upon by the students that the problems selected were more difficult than on a "traditional" test in my class).

That was last spring. I continued the experiment for the rest of that semester. I tried it again in summer school. I am trying it again this fall. The only test where the procedure has not been allowed is for the divisional competency test given at the end of the course. That will be an area in which I can measure the degree of success of this testing procedure. It will be awhile before my data is ready for revelation, but the response, the sharing, the comradeship demonstrated by such statements as "How did WE do?" have been my encouragement to continue.

To a veteran teacher who has heard years of disparaging remarks about mathematics, it is, indeed, heartening to see students begin a test with genuine hope, to work at that task diligently and cooperatively and, yes, to show evidence of some enjoyment. In my opinion, the thought of cooperative learning holds many implications for individual growth and a sense of community that seems to be disappearing in today's world.

In the words of an ancient sage, "Come, let us reason together."

Barbara Lester
Mathematics/Data Processing

For further information, contact the author at Ashland Community College, 1400 College Drive, Ashland, KY 41101.

Editor's Note: This strategy is the subject of another *Innovation Abstracts* issue ("Tandem Testing," Vol. VIII, No. 29). The authors of these articles are not acquainted but agree that this is a terrific idea and that "its time has come."

Community College Leadership Program, The University of Texas at Austin, EDB 348, Austin, Texas 78712